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Spiders (Araneae) on trunks and large branches of oak (*Quercus robur*) in SW Finland

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Spiders (Araneae) on trunks and large branches of oak *(Quercus robur)* **in SW Finland.** - Spiders were collected using special traps on large oaks (*Quercus robur* L.) in seven isolated oak groves near Turku in southwestern Finland (about 60°N), at the northern limit of the tree. The most abundant and typical spider species trapped on oak trunks and on large (horizontal) branches at most study sites were *Moebelia penicillata* (Westring), *Drapetisca socialis* (Sundevall) and *Hypomma cornutum* (Blackwall) (of Linyphiidae), *Theridion tinctum* (Walckenaer), *T. mystaceum* L. Koch and *Steatoda bipunctata* (Linnaeus) (of Theridiidae), *Zygiella stroemi* (Thorell) (Araneidae), *Salticus cingulatus* (Panzer) (Salticidae) and *Anyphaena accentuata* (Walckenaer) (Anyphaenidae). Other typical and locally numerous species were *Haplodrassus cognatus* (Westring), *Micaria subopaca* Westring, *Enoplrys erratica* (Walckenaer), *Nuctenea umbratica* (Clerck), *Aranens diadematus* Clerck and *Hahnia pusilla* C. L. Koch. Some oak-dwelling species rare in Finland were also trapped, including *Agyneta innotabilis* (O. P.-Cambridge), *Theridion pallens* Blackwall, *Xysticus lanio* C. L. Koch and *Clubiona comta* C. L. Koch. A typical "oak spider" fauna was found even in the smallest (0.5 ha) oak woodland studied.

Key-words: spiders - oak - arboreal - Finland - Araneae - *Quercus*.

INTRODUCTION

Oak (*Quercus robur* L.) reaches its northern limit in southwestern Finland. The oak woodlands are small in area, with the largest forests found in the archipelago and in the narrow coastal area of southwesternmost Finland. The largest oak forest in Finland, almost 90 hectares, is situated on the island of Ruissalo, in Turku. It was included in the present study.

In the present paper, data on spider fauna living on trunks and large horizontal branches of old oak trees near the city of Turku is presented and discussed. This work is part of an investigation of invertebrates in protected oak forests in southwestern Finland (Rinne *et al.* in press).

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STUDY AREA, MATERIAL AND METHODS

The seven oak forests studied lie at 60°15'- 60°40'N, near the city of Turku. They all are near the sea, less than 5 km from the coastline. All have been within the influence of human activity, for example grazing by cattle and timber cutting, for a long period. The forests are presently protected.

The size in hectares of the oak forests studied (site name abbreviation in parentheses) and the trapping periods were as follows:

Ruissalo (Turku) 87 ha;	(RU)	6.5.-29.9.1994
Lenholm (Parainen) 8 ha;	(LE)	9.5.-29.9.1994
Nyynäinen (Lemu) 3.3 ha;	(NY)	13.5.-30.9.1994
Tammimäki (Mietoinen) 3.1 ha;	(TA)	13.5.-30.9.1994
Kurasmäki (Mynämäki) 2.3 ha;	(KU)	13.5.-30.9.1994
Linnavuori (Turku) 1.1 ha;	(LI)	2.6.-2.10.1994
Muntti (Taivassalo) 0.5 ha;	(MU)	13.5.-30.9.1994

Spiders were collected using two types of traps. The fauna living on trunks were caught with small window traps (two 21 x 40 cm perpendicular acrylic plates with a funnel and a preservation jar underneath). On horizontal branches special traps were used; a 1.5 cm high "collar" with a teflon ("FLUON") surface was fitted tightly around the branch, and a funnel with preservation jar was positioned below the collar. The window traps were at a height of 1-5 m on large old oaks trunks, many of them in front of a hole in the trunk. The branch traps at a height of 3-6 m on horizontal branches with a diameter of 15 to 30 cm.

There were five window and five branch traps at all sites, except at Linnavuori where only four window and three branch traps were used (the trapping period at Linnavuori was also shorter than at the rest of sites).

Altogether ca. 1350 identifiable spider specimens was caught, of these 60 % with branch traps. The material is deposited in the Zoological Museum of the University of Turku.

RESULTS

Altogether, 73 spider species were collected using branch and window traps. The most species-rich families were:

Linyphiidae (s. lat.)	35 species
Theridiidae	8
Araneidae	6
Clubionidae	5
Salticidae	3
Thomisidae	3
Others	13

The rank of the four most abundantly trapped species (consisting of ca. 55 % of all identifiable spiders) at each site was as follows (1 = the most abundant at the site, etc; - = not among the 10 most abundant species):

	RU	LE	NY	TA	KU	LI	MU
Theridion tinctum	-	1	3	4	4	1	1
Drapetisca socialis	2	-	1	1	2	2	5
Moebelia penicillata	1	3	2	5	1	3	2
Anyphaena accentuata	4	4	6	2	3	-	3

As can be seen, marked differences in the dominant species was found between sites.

Species which were trapped more abundantly with branch traps can be considered as "branch-dwellers" and species caught more abundantly with window traps as "trunk-dwellers" or "hole-dwellers".

TABLE 1

The most abundant spiders collected from oaks in SW Finland by branch traps (b.tr.) and window traps (w.tr.), and the percentage of total catch by branch traps.

	b.tr.	w.tr.	total	% by b.tr.
Theridion tinctum	155	51	206	75.2
Drapetisca socialis	82	122	204	40.2
Moebelia penicillata	171	29	200	85.5
Anyphaena accentuata	82	41	123	66.7
Steatoda bipunctata	37	31	68	54.4
Zygiella stroemi	41	26	67	61.2
Salticus cingulatus	52	8	60	86.7
Hypomma cornutum	39	15	54	72.2
Helophora insignis	19	16	35	54.3
Theridion mystaceum	15	15	30	50.0
Araneus diadematus	18	7	25	72.0
Linyphia triangularis	7	15	22	31.8
Halnia pusilla	10	11	21	47.6
Euophrys erratica	9	4	13	69.2
Nuctenea umbratica	12	-	12	100.0
Clubiona pallidula	7	4	11	63.6
Ozyptila praticola	3	8	11	27.3
Haplodrassus cognatus	9	1	10	90.0
Xysticus audax	4	6	10	40.0
Clubiona comta	2	7	9	22.2
Lepthyphantes minutus	1	8	9	11.1

Abundant species typically found in branch traps were *Salticus cingulatus* (Panzer) (87% by branch traps; see Table 1), *Moebelia penicillata* (Westring)(86%) and *Theridion tinctum* (Walckenaer) (75%). The following, less abundant species

were also frequently found in branch traps: *Nuctenea umbratica* (Clerck) (only in branch traps), *Haplodrassus coguatus* (Westring), *Micaria subopaca* Westring, *Agyneta innotabilis* (O. P.-Cambridge), *Theridion varians* Hahn and *Xysticus lanio* C. L. Koch (the three last-mentioned only in branch trap).

Theridion mystaceum L. Koch and *Hahnia pusilla* C. L. Koch were caught equally abundantly by both trap types.

Abundant species more common in window traps were *Linyphia triangularis* Sundevall (68% by window traps) and *Drapetisca socialis* (Sundevall) (60 %); less abundant species collected especially with window traps were *Clubiona comta* C. L. Koch, *Agyneta conigera* (O. P.-Cambridge), *Ozyptila praticola* (C. L. Koch), *Phrurolithus festivus* (C. L. Koch), *Thyreosthenius parasiticus* (Westring), *Neriene clathrata* (Sundevall) and *N. montana* (Clerck) (the four last-mentioned only by window traps).

Rare, mainly southwestern species in Finland are *Xysticus lanio*, *Cheiracanthium oncognatum* Thorell, *Clubiona comta*, *Zygiella atrica* (C. L. Koch), *Theridion pallens* Blackwall, *T. tinctum*, *Agyneta innotabilis*, *Lepthyphantes minutus* (Blackwall) and *Hyponuua cornutum* (Blackwall). In addition, *Segestria senoculata* (Linnaeus), *Euophrys erratica* (Walckenaer), *Nuctenea umbratica*, *Enoplognatha ovata* (Clerck) and *Theridion mystaceum* have a southwestern range in Finland. *Lepthyphantes leprosus* (Ohlert) was found for the first time in a natural habitat in Finland; it has previously been found only from human-influenced sites as synantropic species (Palmgren 1975). Now it was caught by a window trap near a hole in an old oak. *Lepthyphantes expunctus* (O. P.-Cambridge) has a northern range, and it was caught at Kurasmäki (the site furthest from sea shore), which lies at the southwestern limit of the species.

Some species regarded as ground-dwellers were caught on oak branches. These include *Hahnia pusilla* and *Savignya frontata* (Blackwall), which were both trapped in good numbers on branches 3-6 m above the ground.

The area of the oak forests studied had no marked effect on the number of typical "oak woodland" species (Table 2), of which some, however, were found in the present study in low numbers only. Even at Muntti (area of 0.5 ha) 14 species were found (range 12-16). Thus, even in small isolated forests, a spider fauna typical of oak woodland was found. The differences found in total species and "typical" species numbers were probably explained by the rather small number of traps and by local, small-scale differences between the oak trees fitted with traps.

DISCUSSION

Many of the present species have been found on the trunks (and canopy) of various trees in Europe, thus indicating that this trunk/branch fauna generally lives on trees, not especially on oaks. Of the present species Wunderlich (1982) listed *Agyneta innotabilis*, *Drapetisca socialis*, *Moebelia penicillata*, *Theridion mystaceum* and *Micaria subopaca* as exclusive dwellers on or under bark of living trees in Central Europe; and *Segestria senoculata*, *Steatoda bipunctata* (Linnaeus), *Lepthy-*

TABLE 2

"Typical" species for oak forests of SW Finland, caught by branch and window traps. RU = Ruissalo, LE = Lenholm, NY = Nyynäinen, TA = Tammimäki, KU = Kurasmäki, LI = Linnavuori, MU = Muntti.

	RU	LE	NY	TA	KU	LI	MU	Freq.
Anyphaena accentuata	X	X	X	X	X	X	X	7/7
Araniella cucurbitina	-	-	-	-	-	-	X	1
Nuctenea umbratica	X	-	X	-	-	X	X	4
Zygiella atrica	X	-	-	-	-	-	-	1
Z. stroemi	X	X	X	X	X	-	X	6
Clubiona comta	X	-	X	-	-	X	X	4
C. pallidula	-	-	-	X	X	X	X	4
Haplodrassus cognatus	X	-	X	-	X	X	-	4
Micaria subopaca	X	-	X	-	X	-	-	3
Agyneta innotabilis	-	X	X	X	X	-	-	4
Lepthyphantes leprosus	-	-	-	X	-	-	-	1
L. minutus	-	X	X	-	X	-	-	3
Macrargus boreus	-	-	-	-	-	X	-	1
Neriene montana	-	X	-	-	-	-	X	2
Hypomma cornutum	X	X	X	X	X	X	X	7
Moebelia penicillata	X	X	X	X	X	X	X	7
Thyreosthenius parasiticus	-	-	-	X	X	-	X	3
Euophrys erratica	-	-	-	-	-	X	-	1
Salticus cingulatus	X	X	X	X	X	X	X	7
Segestria senoculata	-	X	-	-	X	X	-	3
Dipoena tristis	X	-	-	-	X	X	-	3
Enoplognatha ovata	-	-	-	-	-	X	-	1
Steatoda bipunctata	X	X	X	X	X	-	X	6
Theridion mystaceum	X	X	X	X	X	-	X	6
T. pallens	X	X	-	-	-	-	-	2
T. tinctum	X	X	X	X	X	X	X	7
Xysticus lanio	X	-	-	-	-	X	-	2
Total	16	13	14	12	16	15	14	
Total number of species	32	23	32	31	34	30	30	

phantes minutus, *Thyreosthenius parasiticus* and *Nuctenea umbratica* as frequent bark-dwellers.

WUNDERLICH (1982) mentioned *Hahnia picta* Kulczynski and among four *Salticus* species especially *S. scenicus* (Clerck) as bark species; in the present material abundant species were *Hahnia pusilla* and *Salticus cingulatus*. Recently, *S. cingulatus* was found in good numbers and *Hahnia pusilla* infrequently on pine trunks (BRAUN 1992). Also *Saviguya frontata*, known as a ground-dweller (like *H. pusilla*), has been trapped on (pine) trunk in Scotland (CURTIS & MORTON 1974).

More than 50 of the 73 spiders found have been reported on trunks of pine, spruce and beech in Central Europe (ALBERT 1976, 1979, MARC 1990, BRAUN 1992, SIMON 1994). Of the abundant or other interesting oak species (Tables 1-2) in Finland, only the following were not listed in the above-mentioned Central-European studies: *Helophora insignis* (Blackwall), *Ozyptila praticola* (however, see ROBERTS 1995),

Haplodrassus cognatus, *Lepthyphantes leprosus* (however, see LOCKET & MILLIDGE 1953), *Macrargus boreus* Holm (a northern species) and *Dipoena tristis* (Hahn). Also *Zygiella stroemi*, a rare species in Central Europe, is absent in the above-mentioned papers; however, SACHER (1991) reported it on pine trunks in Austria.

Little is known about oak fauna (TURNBULL 1960, CURTIS & MORTON 1973, NICOLAI 1986). TURNBULL (1960) listed *Anyphaena accentuata*, *Xysticus lanio*, *Theridion mystaceum* and *Zygiella atrica* as typical oak canopy species in England; the most abundant species, occurring in all above-ground vegetation layers was *Theridion pallens*; see also GRIFFITHS (1995). The most abundant species on oak trunks in Germany were *Moebelia penicillata*, *Drapetisca socialis*, *Micaria subopaca* and *Agyneta innotabilis* (NICOLAI 1986).

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